

Ball Splines

Both Ends Stepped and Threaded

Both Ends Stepped and Threaded

RoHS10

Both Ends Stepped and Threaded	Spline Shaft / 52100 Bearing Steel Nut / 4115 Alloy Steel Equivalent / Hardness: 58 HRC min.		Spline Shaft, Nut / 440C Stainless Steel Equivalent / Hardness: 55 HRC min.	
	Nut 1 pc.		Nut 1 pc.	
With Round Flange Nut	BSYM		BSYMS	
With Compact Flange Nut	BSYN		—	
With Straight Nut	BSYS		BSYSS	

① When selecting Overall Length (L Dimension), check the Annealing Range. P.409
 ② Accuracy P.407
 ③ Choose Accessories Nuts from the following Shapes.

Flanged Nut Orientation

1 Nut Type

2 Nut Type (When Alteration NTW is specified)

Round Flange Nuts

No. 6, 8 (3-d Oil Hole)

No. 10, 13 (4-d Oil Hole)

No. 16, 20, 25, 30 (5-d Oil Hole)

Compact Flange Nuts

No. 6, 8 (2-Mounting Holes, 3-d Oil Hole)

No. 10 (2-Mounting Holes, 4-d Oil Hole)

Straight Nuts

No. 6, 8 (3-d Oil Hole)

No. 10, 13 (4-d Oil Hole)

No. 16, 20, 25, 30 (5-d Oil Hole)

* The key is press-fit into the nut.

Dimension of Attached Key

Spline Shafts

Part Number	Type	1mm Increment				P, Q	M (Coarse), N (Coarse) (M≤P, N≤Q)	D	(Y)	Mass (kg/m)
		No.	L	F, E	B, S					
BSYM BSYN BSYS BSYSS	*6	60-400 (190)	When P, Q=3 4≤F, E≤9	When M, N=3 2≤B, S≤M, Nx3 When M, N=4 2≤B, S≤M, Nx4 When M, N=5 2≤B, S≤M, Nx5 ① B, S≥Pitch×3+ℓ	3 4 5	3 4 5	6	52-392 (182)	0.23	
	*8	60-400 (190)			4 5 6	4 5 6	8	52-392 (182)	0.39	
	*10	60-600 (390)	When P, Q=4 4≤F, E≤16	② For Stainless Steel materials, M, N≤B, S≤M, Nx3	4 5 6 8	4 5 6 8	10.4	52-592 (382)	0.65	
	*13	60-600 (390)			5 6 8 10	5 6 8 10	13.4	52-592 (382)	1.11	
	*16	70-600 (390)	When P, Q≥5 4≤F, E≤P, Q×5	③	5 6 8 10 12 13	6 8 10 12	16.6	62-592 (382)	1.65	
	20	80-700			8 10 12 13 15 16	6 8 10 12 16	20.6	72-692	2.57	
25	90-900	④ F, E≥B, S+2	⑤	8 10 12 13 15 16 20	6 8 10 12 16 20	25.8	82-892	4.04		
30	100-1150			10 12 13 15 16 20 25	8 10 12 16 20 24	30.8	92-1142	5.85		

① For BSYS and BSYM, only *marked sizes are available, and the Max. L and Y dimensions are in ().
 ② For BSYN, only No. 6, 8 and 10 are available.

Round Flange Nuts / Compact Flange Nuts

No.	D (h6)	L	Df	H	P.C.D.	d ₁	d ₂	h	W	d	B	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)
												Dynamic C ₁ (N-m)	Static C ₀₂ (N-m)	Dynamic C (kN)	Static C ₀ (kN)	M ₀₁ (N-m)	M ₀₂ (N-m)	
6	14	25	30	6	22	3.5	6	3.1	6.5	1.5	18	3.8	7	1.2	2.1	5	36	0.03
8	16	32	32	6	24							21	4.8	8.7	1.2	2.1	5	36
10	21	40 (33)	42 (41)	6 (8)	32 (30)	4.5	8	4.4 (5.3)	14 (8.5)	1.5	25	19 (11)	34 (21)	3.8 (2.4)	6.9 (4.3)	26 (15)	181 (102)	0.09
13	24	44 (36)	44 (45)	7 (8)	33 (34)							28 (20)	52 (37)	4.6 (3.3)	8.3 (5.9)	36 (22)	251 (148)	0.11
16	31	50	51	7	40	5.5	9.5	4.4	18	2	—	51	93	6.2	11.1	56	386	0.2
20	35	63	58	7	45							85	154	8.5	15.3	83	611	0.3
25	42	71	65	9	52	6.6	11	6.5	30	2.5	—	193	348	15.4	27.7	173	1248	0.4
30	47	80	75	10	60							272	490	18.5	33.3	212	1581	0.57

① Dimensions in () are for 440C Stainless Steel. ② Allowable static moment M01 is a value measured when a single nut is used, and M02 is a value measured when two nuts are used.

Straight Nuts

No.	D (h6)	L	b	Tolerance	t +0.05 0	d	①	Basic Rated Torque		Basic Load Rating		Allowable Static Moment		Mass (kg)	Dimension of Key (Included)							
								Dynamic C ₁ (N-m)	Static C ₀₂ (N-m)	Dynamic C (kN)	Static C ₀ (kN)	M ₀₁ (N-m)	M ₀₂ (N-m)		B	Tolerance	h	Tolerance	L ₁	R		
6	14	25	2.5	+0.014 0	1.2	15°	25°	3.8	7	1.2	2.1	5	36	0.012	2.5	+0.016 +0.006	3	3	0	-0.025	10.5	1.25
8	16	32	3					4.8	8.7	1.2	2.1	5	36	0.013							10.5	
10	21	40 (33)	3	+0.018 0	1.5	—	—	19 (11)	34 (21)	3.8 (2.4)	6.9 (4.3)	26 (15)	181 (102)	0.06	3.5	+0.024 +0.012	4	4	0	-0.030	17 (14)	2
13	24	44 (36)	4					28 (20)	52 (37)	4.6 (3.3)	8.3 (5.9)	36 (22)	251 (148)	0.07							17 (14)	
16	31	50	3.5	+0.018 0	2	—	—	51	93	6.2	11.1	56	386	0.15	4	+0.024 +0.012	4	4	0	-0.030	18	1.75
20	35	63	4					85	154	8.5	15.3	83	611	0.2							29	
25	42	71	4	+0.018 0	2.5	—	—	193	348	15.4	27.7	173	1248	0.29	4	+0.024 +0.012	4	4	0	-0.030	33	2
30	47	80	4					272	490	18.5	33.3	212	1581	0.37							42	

① Dimensions in () are for 440C Stainless Steel. ② Allowable static moment M01 is a value measured when a single nut is used, and M02 is a value measured when two nuts are used.

Ball Splines

Both Ends Stepped and Threaded, continued

Part Number Alterations

BSYS8 - 250 - F26 - E20 - B8 - S8 - P6 - Q6 - M6 - N6 - SC15

Alterations	Wrench Flats	Set Screw Flat	Additional Spline Nuts																																																			
Code	SC	FC	NTW																																																			
Spec.	Adds a wrench flat. SC=1mm Increment ① SC+ℓ ₁ ≤L <table border="1"> <tr><th>No.</th><th>W</th><th>ℓ₁</th></tr> <tr><td>6</td><td>5</td><td>8</td></tr> <tr><td>8</td><td>7</td><td>10</td></tr> <tr><td>10</td><td>8</td><td>13</td></tr> <tr><td>13</td><td>11</td><td>16</td></tr> <tr><td>16</td><td>14</td><td>20</td></tr> <tr><td>20</td><td>17</td><td>25</td></tr> <tr><td>25</td><td>22</td><td>30</td></tr> <tr><td>30</td><td>27</td><td>—</td></tr> </table>	No.	W	ℓ ₁	6	5	8	8	7	10	10	8	13	13	11	16	16	14	20	20	17	25	25	22	30	30	27	—	Adds a set screw flat. Ordering Code: FC10-A8 FC, A=1mm Increment ① FC≤3xD ② When 1.5xD<FC, FC≤Y/2 ③ A=0 or A≥2 <table border="1"> <tr><th>No.</th><th>h</th></tr> <tr><td>6</td><td>8</td></tr> <tr><td>8</td><td>10</td></tr> <tr><td>10</td><td>13</td></tr> <tr><td>13</td><td>16</td></tr> <tr><td>16</td><td>20</td></tr> <tr><td>20</td><td>25</td></tr> <tr><td>25</td><td>30</td></tr> </table>	No.	h	6	8	8	10	10	13	13	16	16	20	20	25	25	30	Adds a nut. (from one to two) ① Only available for BSYS, BSYM and BSYN. <table border="1"> <tr><th>M, N</th><th>(ℓ₁), (ℓ₂)</th></tr> <tr><td>6 or Less</td><td>2</td></tr> <tr><td>8, 10</td><td>3</td></tr> <tr><td>12 or More</td><td>5</td></tr> </table>	M, N	(ℓ ₁), (ℓ ₂)	6 or Less	2	8, 10	3	12 or More	5
No.	W	ℓ ₁																																																				
6	5	8																																																				
8	7	10																																																				
10	8	13																																																				
13	11	16																																																				
16	14	20																																																				
20	17	25																																																				
25	22	30																																																				
30	27	—																																																				
No.	h																																																					
6	8																																																					
8	10																																																					
10	13																																																					
13	16																																																					
16	20																																																					
20	25																																																					
25	30																																																					
M, N	(ℓ ₁), (ℓ ₂)																																																					
6 or Less	2																																																					
8, 10	3																																																					
12 or More	5																																																					

Incomplete Thread Dimensions

① When selecting multiple alteration additions, more than 2 mm is needed between each feature to be added. Orientation between wrench flats or set screw flats to the spline nut keyway or flange counterbores are random and cannot be specified.

Part Number Example

BSYS8 - 250 - F20 - E20 - B8 - S8 - P6 - Q6 - M6 - N6

BSYS8G - 250 - F20 - E20 - B8 - S8 - P6 - Q6 - M6 - N6

BSYS8L - 250 - F20 - E20 - B8 - S8 - P6 - Q6 - M6 - N6

① Alternative grease types available.

Cautions for Ball Spline

Lubrication

Ball splines are shipped greased. Reapply lubrication with Lithium soap based grease (Alvania Grease S2 by Showa Shell Sekiyu K.K), etc. as needed.

Tolerance for Mating Bores

An H7 tolerance is recommended for mating bores for the spline nuts.

Nut Removal

Balls do not fall out when the spline shaft is pulled out. Once the nuts are removed from the spline shaft, reassemble the ball spline while confirming match No.'s, character orientations, and positional relationship of these parts.

Nuts and shafts are offered as the set product. Thus, when using multiple pcs. of them, do not change the default combination.

Adding Nuts

The ball spline ensures clearance and accuracy by integrating the nuts and shaft into one set. Thus, the nuts or shafts are not sold as separate items. When two nuts are required, select the 2-nut type part number.

